# **INSTITUTE OF AERONAUTICAL ENGINEERING**

#### (Autonomous) Dundigal-500043, Hyderabad

B.Tech IV SEMESTER END EXAMINATIONS (REGULAR) - JULY 2022

Regulation:UG20

**OPERATING SYSTEMS** 

Time: 3 Hours

(Common to CSE | IT |CSIT)

Max Marks: 70

#### Answer ALL questions in Module I and II Answer ONE out of two questions in Modules III, IV and V

(NOTE: Provision is given to answer TWO questions from among one of the Modules III / IV / V

All Questions Carry Equal Marks

## All parts of the question must be answered in one place only

# MODULE - I

- 1. (a) What is system call? Explain types of system calls in brief. Differentiate between multithreading and multiprocessing. [BL: Understand| CO: 1|Marks: 7]
  - (b) List any four functions of the operating system. "Operating system is a resource manager". If yes, then why? Justify your answer. [BL: Apply] CO: 1|Marks: 7]

## $\mathbf{MODULE}-\mathbf{II}$

- 2. (a) Explain the following terms:
  - i) Process synchronization
  - ii) Pre-emptive and non-preemptive scheduling [BL: Understand | CO: 2|Marks: 7]
  - (b) Does preemptive scheduling give same performance as non-preemptive scheduling algorithm? Compare their performance by assuming at least 3 processes arrived at different time intervals.

[BL: Apply| CO: 2|Marks: 7]

# $\mathbf{MODULE}-\mathbf{III}$

- 3. (a) Discuss how the CPU utilization and response time pair of scheduling criteria conflict in certain settings. [BL: Understand| CO: 3|Marks: 7]
  - (b) Compare the memory organization schemes of contiguous memory allocation, pure segmentation, and pure paging with respect to the following issues:
    - i) External fragmentation
    - ii) Internal fragmentation

- [BL: Understand| CO: 3|Marks: 7]
- 4. (a) What is the purpose of paging and page tables? Explain the difference between internal and external fragmentation. [BL: Understand] CO: 4|Marks: 7]
  - (b) Consider the following page reference string: 7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 3, 2, 1, 2, 0, 1, 7, 0, 1 Explain the least recently used (LRU) page replacement algorithm.

[BL: Apply| CO: 4|Marks: 7]

- 5. (a) Explain the following disk scheduling algorithms
  - i) LOOK algorithm
  - ii) C-LOOK algorithm
  - iii) SCAN algorithm
  - iv) C-SCAN algorithm

 (b) Explain in detail about various ways of accessing disk storage. Enumerate indexed allocation method.
[BL: Apply] CO: 5|Marks: 7]

- 6. (a) Describe in detail about file attributes, operations and types and structures.Explain the information associated with an open file. [BL: Understand] CO: 5|Marks: 7]
  - (b) Write a short note on file and file system mounting. Explain file access method with example.

[BL: Apply] CO: 5|Marks: 7]

[BL: Understand] CO: 5|Marks: 7]

### $\mathbf{MODULE}-\mathbf{V}$

- 7. (a) What do you understand by deadlock? Explain deadlock detection algorithm with an example. [BL: Understand] CO: 6|Marks: 7]
  - (b) Consider the following snapshot of a system given in Table 1:

#### Table 1

	Allocation	Max
	A B C D	A B C D
P0	$3\ 0\ 1\ 4$	$5\ 1\ 1\ 7$
P1	$2\ 2\ 1\ 0$	$3\ 2\ 1\ 1$
P2	$3\ 1\ 2\ 1$	$3\ 3\ 2\ 1$
P3	$0\;5\;1\;0$	4612
P4	$4\ 2\ 1\ 2$	$6\ 3\ 2\ 5$

Using the banker's algorithm, determine whether or not each of the following states is unsafe. If the state is safe, illustrate the order in which the processes may complete. Otherwise, illustrate why the state is unsafe.

- i) Available = (0, 3, 0, 1)
- ii) Available = (1, 0, 0, 2)

[BL: Apply] CO: 6|Marks: 7]

- 8. (a) What are the approaches to recover from deadlock? Discuss resource allocation graph with respect to deadlock. [BL: Understand| CO: 6|Marks: 7]
  - (b) Given 3 processes A,B and C, three resources x,y and z and following events, i) A requests x ii) A requests y iii) B requests y iv) B requests z v) C requests z vi) C requests x vii) C requests y Assume that requested resources should always be allocated to the request process if it is available. Draw the resource allocation graph for the sequences. And also mention whether it is a deadlock? If it is, how to recover the deadlock

[BL: Apply| CO: 6|Marks: 7]